Modelling The Reality In Planning: SPDSS Experiences In Malaysia

ALIAS ABDULLAH[1], MUHAMMAD FARIS ABDULLAH[1],
MUHAMMAD NUR AZRAEI SHAHBUDDIN[1]
& RICHARD E. KLOSTERMAN[2]

ABSTRACT

Spatial Planning and Decision Support System (SPDSS) is a computer system that provides information to help town planners and decision makers to make better informed decisions. Since the mid 1990s, a number of initiatives have been undertaken to explore SPDSS potentials in Malaysian town and country planning field, both theoretically and practically. The public planning agencies have been the main player in exploring SPDSS application in real-life project, while the academics are more content towards investigating potential new areas for SPDSS application in Malaysian planning. Simultaneously, to ensure greater application and appreciation of SPDSS, efforts have also been directed towards introducing SPDSS to wider audience, not just town planners, but also decision makers.

ABSTRAK

Sistem Pembuat Keputusan Perancangan reruang (SPDS) merupakan system computer yang menyediakan maklumat untuk membantu para perancang bandar dan pembuat keputusan membuat keputusan bermaklumat yang lebih baik. Semenjak pertengahan 1990an, beberapa inisiatif telah diambil untuk meneroka potensi SPDSS di bandar-bandar Malaysia dan bidang perancangan bandar negara secara teori dan praktiknya. Agensi perancangan awam meruapakan pemain utama dalam meneroka aplikasi SPDSS dalam projek sebenar, manakala para ahli akademik menumpukan kepada penelitian potensi bidang baru untuk aplikasi SPDSS dalam perancangan di Malaysia. Untuk memastikan aplikasi yang lebih baik dan penerimaan SPDSS, usaha juga diarahkan untuk memperkenalkan SPDSS kepada khalayak yang lebih besar bukan hanya kepada perancang Bandar, tetapi juga pembuat keputusan.

INTRODUCTION

The aim of this paper is to look at the experiences of spatial planning and decision support system (SPDSS) application in Malaysian town planning. This paper firstly, in brief, discusses the underlying principles of SPDSS. It then goes on to describe some of the SPDSS application that have taken place in Malaysia.

WHAT IS SPDSS?

Spatial Planning and Decision Support System (SPDSS) can be defined as an interactive, computer-based system designed to support a user or group of users in achieving a higher effectiveness of decision making while solving a semi-structured spatial decision problem (Malczewski, 1999). An SPDSS would allow users to record decision making criteria in a computer database and simplify them in a way to provide comprehensibility (problem structuring), evaluate the importance of each criteria in relation to the decision problem (weighting), formulate decision alternatives and rate those alternatives (ranking). The result of this process can then be used by users to make informed decision.

SPDSS can also be seen as computer model which can be used by users to help in making decision about spatial problems.

THE UNDERLYING PRINCIPLES OF SPDSS

According to Klosterman and Alias Abdullah (2008), in developing SPDSS application, five basic design principles have to be given due considerations.

Principle 1: All models are wrong, some models are useful

Any model is, by definition, is a simplification of reality. Thus, models are wrong because they leave out some aspects of reality. Nevertheless, simplification can be useful in understanding certain aspects of reality. The important consideration here is not whether a model is correct in some absolute sense, but whether the model is useful in helping us understand certain aspects of reality.

Principle 2: Prediction is hard, especially about the future

Precisely predicting the future is especially difficult, if not totally impossible. Therefore, models should not be developed to precisely predict the future, but rather to provide a range of forecast scenarios about the future. Additionally, these forecasts can only be true if their underlying assumptions are true. Thus, models should explicitly state these underlying assumptions.

Principle 3: Keep it simple

Models only appealed to those who can understand them. Thus, it is necessary that models be developed with simplicity in design. People tend to trust only models which they can understand.

Principle 4: Best available data

Very often data available are generally inaccurate and incomplete. However, these are also the best available data. Thus, it important that models should not require extensive data sets that are difficult to obtain. Models should be flexible enough to accommodate the best available data.

Principle 5: Technology is not the only answer

Experiences demonstrate that successful application of models (or technology) is heavily dependent on institutional setting. Thus, it is important to ensure that any model developed received organisation-wide support. One of the ways to ensure this is through institutionalising the use of the model.

SPDSS INITIATIVE IN MALAYSIA

SPDSS application in Malaysian town and country planning is rather recent. The earlier attempts to apply SPDSS in town and country planning processes can be traced back to the mid-1990s (Alias Abdullah et.al, 2004 & Kamalruddin Shamsuddin, 2006a). One of the earlier attempts was the use of Analytic Hierarchical Process (AHP) to support Geographical Information System (GIS) in modelling water resources in Gombak, Selangor (Alias Abdullah et.al, 2004). The project, which was commissioned by the Selangor State Government, was undertaken by a group of academicians from International Islamic University Malaysia (IIUM).

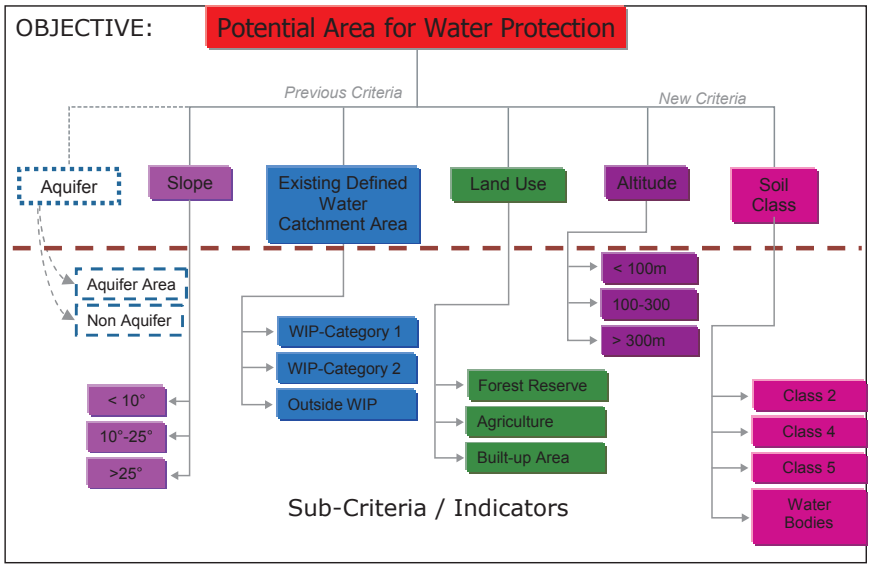

Figure 1: Criteria tree in modelling water resources in Selangor

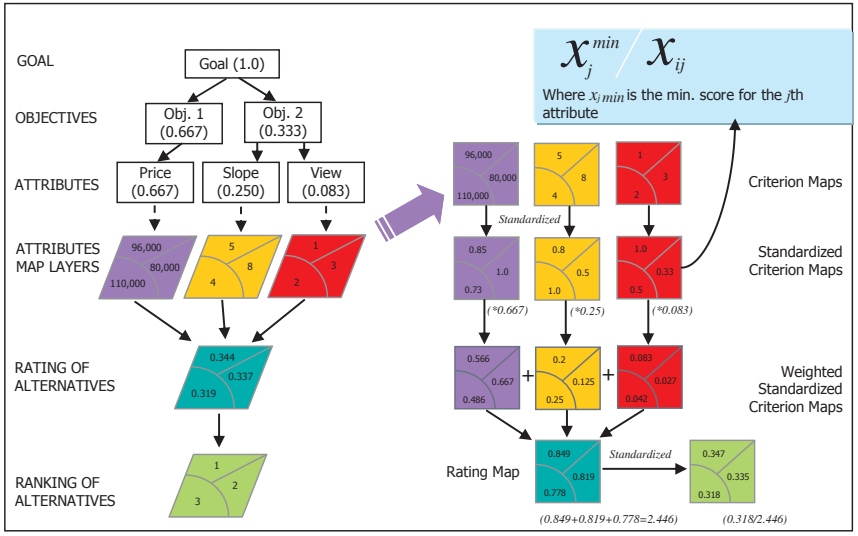

Figure 2: The SPDSS model in modelling water resources in Selangor

Influenced by the successful application of SPDSS in the Selangor water planning project, the then Federal Territory Development and Klang Valley Planning Division (FTDKVPD) of the Prime Minister Department embarked on the Klang Valley Regional Planning Support System project. Under this project, Multiple Criteria Evaluation (MCE) was used to support GIS to generate development scenarios for the Klang Valley area (Kamalruddin Shamsuddin et. al, 2006b).

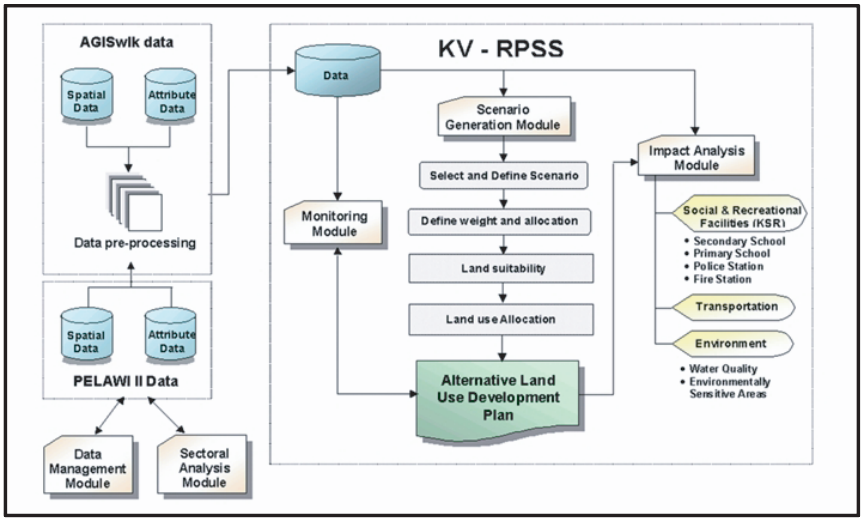

Figure 3: Interrelationship between components in the model used to generate development scenarios for Klang Valley
Source: Kamalruddin et.al. (2006b).

During the past twenty years or so, SPDSS application in town and country planning has been almost always initiated by public agencies or academics. The Federal Department of Town and Country Planning Peninsular Malaysia (FDTCP) have been central in promoting SPDSS application in town and country planning in Malaysia. The Department has experimented with SPDSS in some of the works it undertaken. For instance, the use of multicriteria evaluation (MCE) in performing land suitability analysis for the National Physical Plan and the Kulim District Local Plan (Nur Salehi Kassim & Islam, 2004 & Amandus Jr, 2006)

Another notable application of SPDSS in Malaysian town and country planning was the use of multicriteria decision analysis by FTDKVPD to evaluate alternative rail networks for Klang Valley area (Sharifi et. al, 2004).

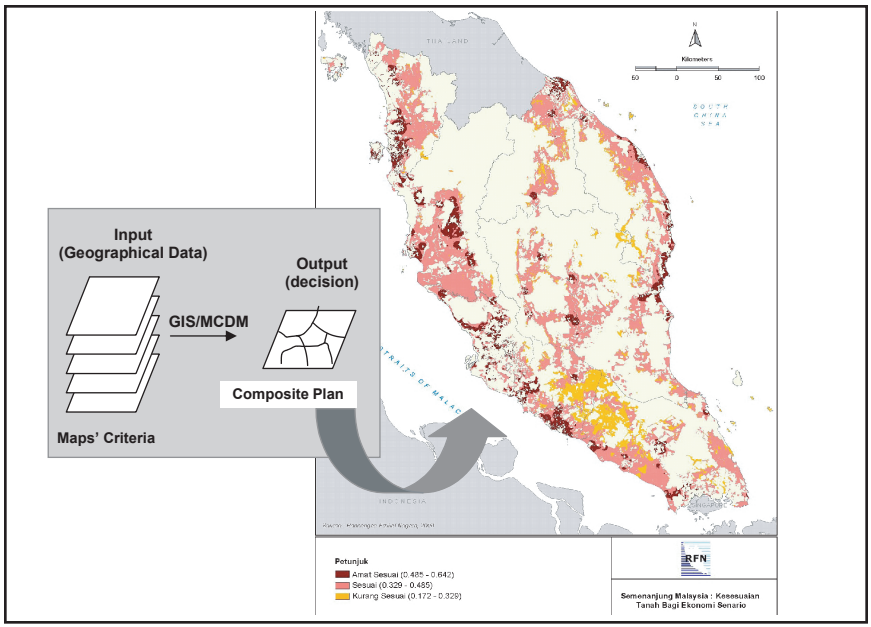

Figure 4: MCE model and the result of National Physical Plan land suitability analysis.
Source: Nur Salehi Kassim & Islam (2004).

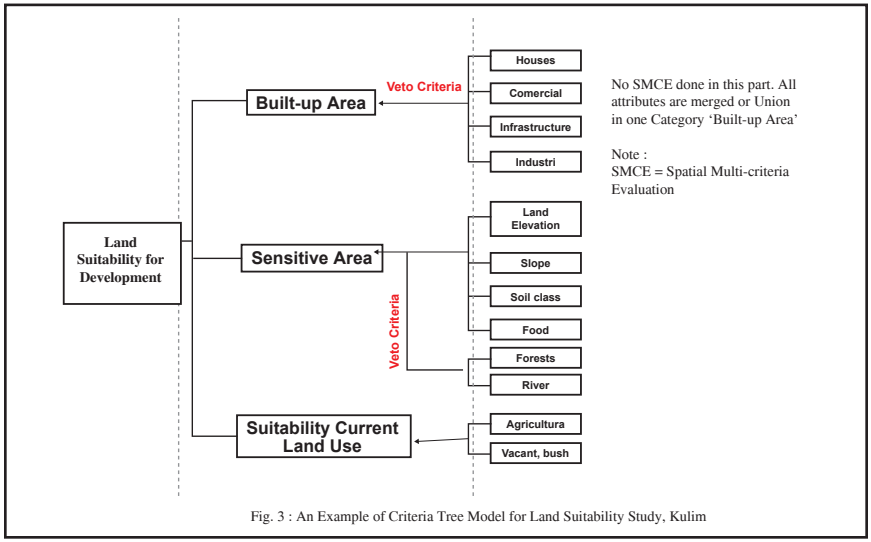

Figure 5: Criteria tree for Kulim District Local Plan land suitability analysis
Source: Amandus Jr. (2006).

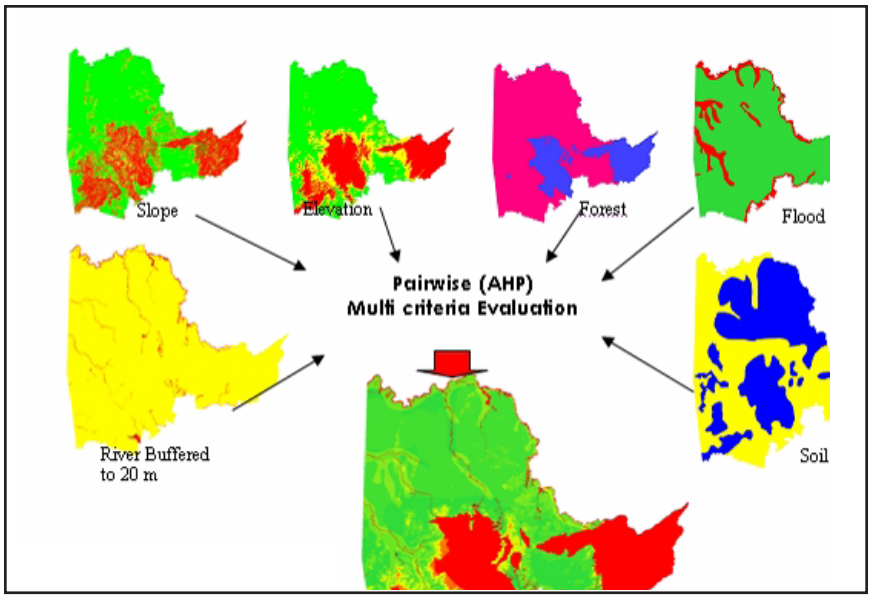

Figure 6: The result for Kulim District Local Plan land suitability analysis
Source: Amandus Jr. (2006).

Figure 7: Alternative light rail networks for Klang Valley
Source: Sharifi et. al. (2004).

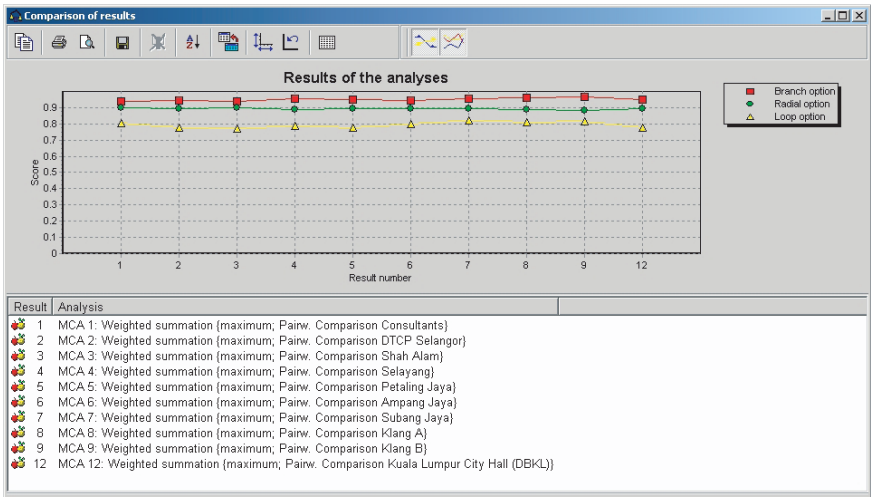

Figure 8: Results of the MCA decision analysis for light rail networks for Klang Valley

Source: Sharifi et. al. (2004).

While the public agencies have been experimenting with SPDSS application in real-life town and country planning projects, the academics have been working on researches related to SPDSS. The academic researches can be categorised into two: those that look for new area for applying SPDSS in Malaysian town and country planning process and those that look to strengthen the process and procedures of SPDSS in Malaysian town and country planning. Some examples of researches under the first category included the application of MCA in urban flood modelling and the use of What If? technique in forecasting land use allocation for Kuala Selangor District in the State of Selangor (Nur Fazzillah Mohamed Noordin et. al., 2007 & Haris Freddy Ismail, 2008).

Since SPDSS has only been recently introduced into Malaysian town and country planning, researches focusing on strengthening the process and procedures of SPDSS application in Malaysian planning are very useful. This type of researches centred on identifying areas within Malaysian town and country planning where SPDSS would be most beneficial and brought about most added value to the planning process, exploring how SPDSS can be integrated in the town planning process and analysing trends of SPDSS spread among Malaysian town planners. For instance, in 2003, a group of academicians from IIUM had engaged in a collaborative research project with colleagues from foreign universities

to look into institutionalisation of SPDSS in Malaysian town and country planning process (Muhammad Faris Abdullah et.al., in press). The two-year research project, entitled 'Expanding Expertise Network for generating and sharing knowledge related to Spatial Planning and Decision Support' (ENSPADS), was funded largely through the ASEAN-EU University Network Programme (AUNP). The project centred on developing four SPDSS course concepts and materials through a joint effort of all project partners. The course concepts and materials were used to train Malaysian town planners. It was hoped that through the trainings, town planners would obtained a better understanding and knowledge about SPDSS, and hence helped the institutionalisation causes.

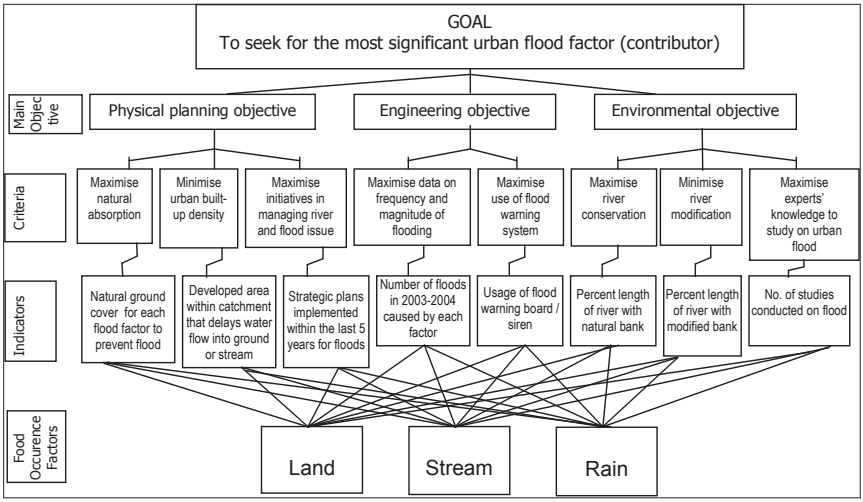

Figure 9: The MCA model in urban flood study
Source: Nur Fazzillah Mohamed Noordin et. al. (2007).

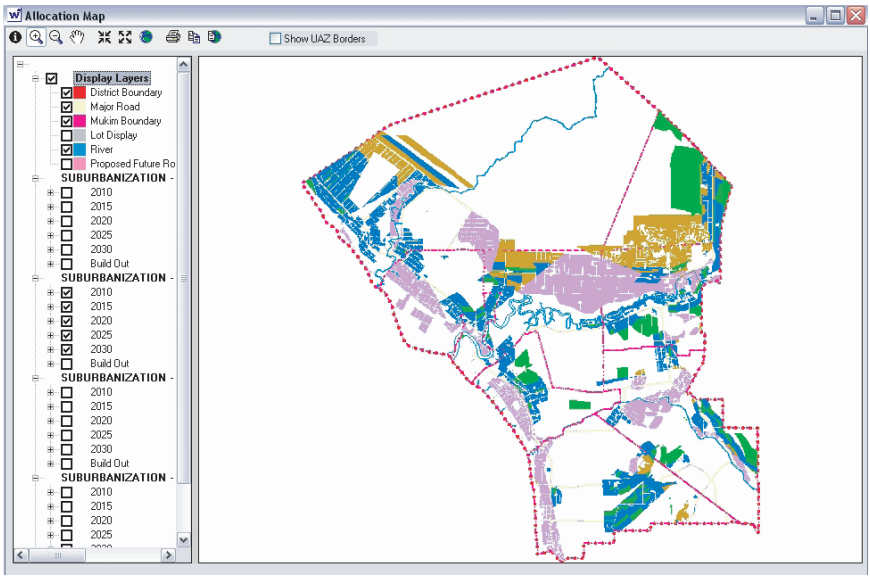

Figure 10: Land use forecast for Kuala Selangor District using What If?
Source: Haris Freddy Ismail (2008).

Another academic research, which was also conducted by academicians from IIUM, centred on analysing the trends of SPDSS spread among Malaysian town planners. Surveys were conducted in year 2004 and year 2007 among Malaysian registered town planners to determine their level of SPDSS awareness (Muhammad Faris Abdullah, et.al., 2005 & Muhammad Faris Abdullah et.al, in press). Results from the latter survey indicated that SPDSS awareness has increased among the town planners. The number of SPDSS specific software, like Ilwis, Definite and What If?, used by the town planners has also increased.

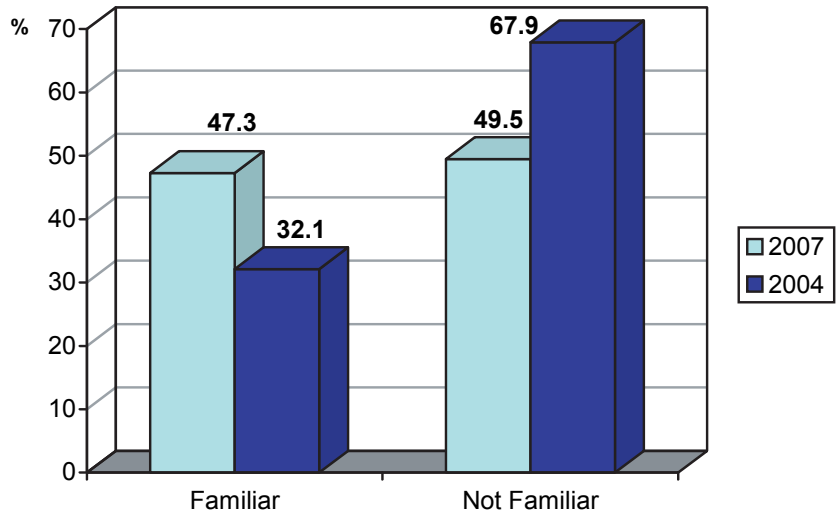

Figure 11: Comparison between the percentages of respondents who are familiar with SPDSS in 2007 and in 2004.
Source: Muhammad Faris Abdullah et. al. (in press).

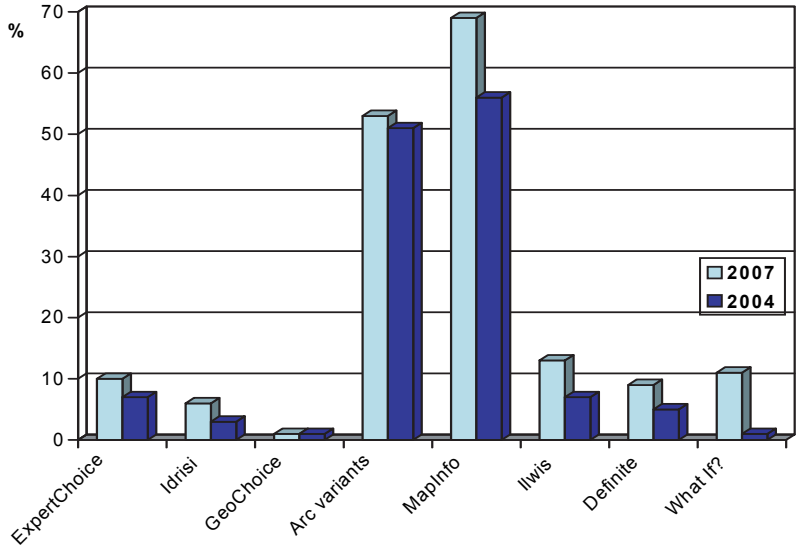

Figure 12: Comparison between the percentages of software used in 2007 and in 2004.
Source: Source: Muhammad Faris Abdullah et. al. (in press).

CONCLUDING REMARKS

Since its recent introduction into Malaysian town and country planning scene, SPDSS application has been well received by town planners in the country. Earlier initiatives created the necessary exposure to enable growing application of SPDSS in Malaysian town and country planning in the future. Efforts from both the public agencies and the academicians can be expected to increase. Even at the time of writing, there are already a number of researches and projects which are being undertaken with regards to SPDSS. For instance, two of the authors themselves are presently undertaking researches to explore the possibility of planning support systems being used to measure performance of development plans. Meanwhile, the FDTCP is also keen to embed MCA application into the preparation of development plans in the country.

REFERENCES

Alias Abdullah, M.Zainora Asmawi & Lukman Hakim Mahamod. 2004. Planning Support System for Modelling Water Resources: Case Analysis of Gombak, Selangor. In Alias Abdullah, Kamalruddin Shamsuddin & Muhammad Faris Abdullah (Eds.), *Applications of Planning and Decision Support Systems* (pp. 1-21). Kuala Lumpur: International Islamic University Malaysia.

Amandus Jr, P. 2006. MCDM and Land Suitability Analysis for Spatial Development: Case Study Kulim Local Plan. In Kamalruddin Shamsuddin (Ed.), *Implementing Multi-Criteria Decision Making in Malaysian Town Planning* (pp. 45-53). Kuala Lumpur: Federal Department of Town and Country Planning Peninsular Malaysia.

Haris Freddy Ismail. 2008. *Planning Support Systems in Local Plan Preparation: a Case Study of What If? Application in Kuala Selangor Local Plan*. Unpublished dissertation, International Islamic University Malaysia.

Kamalruddin Shamsuddin (Ed.) 2006a. *Implementing Multi-Criteria Decision Making in Malaysian Town Planning*. Kuala Lumpur: Federal Department of Town and Country Planning Peninsular Malaysia.

Kamalruddin Shamsuddin, Ruslan Rainis, Mohd Nazari Jaafar & Hadi Harman Shah 2006b. Application of Multi-Criteria Evaluation (MCE) for Scenario Generation within the Klang Valley Regional

Planning Support System, Malaysia. In Kamalruddin Shamsuddin (Ed.), *Implementing Multi-Criteria Decision Making in Malaysian Town Planning* (pp. 55-67). Kuala Lumpur: Federal Department of Town and Country Planning Peninsular Malaysia.

Klosterman, R. & Alias Abdullah. 2008. Computer Technologies in Urban Planning. *Medina Forum Seminar on Developing and Deploying Planning Support Systems*. Medina, Saudi Arabia, February 26, 2008.

Malczewski, J. 1999. *GIS and Multicriteria Decision Analysis*. New York: John Wiley and Sons.

Muhammad Faris Abdullah, Alias Abdullah, Mansor Ibrahim & Dazilah Abdul Samad. 2005. A Study on the Demand of Spatial Planning and Decision Support System in Malaysia. *Planning Malaysia,* 3, 47-60.

Muhammad Faris Abdullah, Alias Abdullah & Mansor Ibrahim (in press). Spread of Decision Support Systems for Planning in Malaysia. In Geneletti, D. & Alias Abdullah (Eds.), *Spatial Decision Support for Urban and Environmental Planning: a Collection of Case Studies*. Shah Alam, Malaysia: Arah Publications.

Nor Salehi Kassim & Islam, R. 2004. The Application of Spatial Planning and Decision Support System in National Physical Planning. *International Conference on SPDSS 2004*. Kuala Lumpur, Malaysia, September 7-8, 2004.

Nur Fazzillah Muhamed Noordin, Alias Abdullah & Muhammad Nur Azraei Shahbudin. 2007. Multicriteria Analysis of Flood Causes in Kuala Lumpur. *Planning Malaysia, 5*, 17-42.

Sharifi, A., Boerboom, L. & Kamalruddin Shamsuddin. 2004. Evaluating Rail Network Options Using Multiple Criteria Decision Analysis (MCDA): Case Study Klang Valley, Malaysia. In Alias Abdullah, Kamalruddin Shamsuddin & Muhammad Faris Abdullah (Eds.), *Applications of Planning and Decision Support Systems* (pp. 21-60). Kuala Lumpur: International Islamic University Malaysia.

[1] International Islamic University Malaysia.
[2] University of Akron, Ohio.